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ABSTRACT

The factor analytic studies that have been done with the Millon Clinical Multiaxial Inventory (MCMI), a 175-item paper-and-pencil test designed to evaluate symptomology in psychiatric patients, have been problematic in that the test's high inter-scale correlation could lead to an artificially robust factor structure. The present investigation avoided the issue of scale overlap by working with the patients' answers to the individual items of the inventory rather than the overlapping scales. The subjects were 2,129 male psychiatric inpatients who completed valid protocols. Principal component analysis led to 17 interpretable factors that accounted for 41% of the variance. Thirteen of these factors contained items resembling scales from the MCMI. These factors represented basic personality scales (e.g., Avoidant), as well as clinical symptom scales (e.g., Dysthymic). Other factors represented more circumscribed characteristics such as suicidality, weepiness, and lability. The MCMI scales most poorly represented in the factor structure were those assessing psychoticism and severely maladaptive personality styles, a surprising finding in a sample of psychiatric inpatients. Also, in contrast to scale-based factor analyses, no general maladjustment factor emerged. (Author)

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FACTOR ANALYTIC STRUCTURE OF THE MCMI ITEMS

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ABSTRACT

The factor analytic studies that have been done with the Millon Clinical Multiaxial Inventory (MCMI), a 175-item paper-and-pencil test designed to evaluate symptomatology in psychiatric patients, have been problematic in that the test's high inter-scale correlation could lead to an artificially robust factor structure. The present investigation avoided the issue of scale overlap by working with the patients' answers to the individual items of the inventory rather than the overlapping scales. The subjects were 2,129 male psychiatric inpatients who completed valid protocols. Principal component analysis led to 17 interpretable factors which accounted for 41% of the variance. Thirteen of these factors contained items resembling scales from the MCMI. These factors represented basic personality scales (e.g., Avoidant), as well as clinical symptom scales (e.g., Dysthymic). Other factors represented more circumscribed characteristics such as suicidality, weepiness, and lability. The MCMI scales most poorly represented in the factor structure were those assessing psychoticism and severely maladaptive personality styles, a surprising finding in a sample of psychiatric inpatients. Also, in contrast to scale-based factor analyses, no general maladjustment factor emerged.

INTRODUCTION

A number of factor analytic studies have been done on the Millon Clinical Multiaxial Inventory (MCMI), a 175-item paper-and-pencil test designed to evaluate symptomatology in psychiatric patients. As Table 1 suggests, there have been a fairly remarkable similarity between the factorial solutions available, in spite of differences in the subject population used. The factors of lability and paranoia, for instance, were labeled in 7 of the 8 studies; schizoid detachment and passive-submission-aggression were noted in 6; psychoticism and general maladjustment was found in 3 of the investigations.

One problem that has been repeatedly cited is the issue of the high inter-scale correlation (Choca, Peterson & Shanley, 1986; Gibertini & Retzlaff, 1987; Hess, 1985; Widiger, 1985). As Guilford (1952) has noted, factor analyzing a group of scales that share items may be inappropriate. The reason for this was explained by Gibertini and Retzlaff in the following manner:

"When two or more scales share items they become linearly dependent to an extent proportional to the percentile of the item-overlap. This essentially guarantees that the correlation matrix to be factored has some degree of structure not provided by the subject response patterns. Some part of the resulting factor pattern, in other words, will be artificial. This artificial structure will be constant across populations. If this effect is large relative to that of the subject response patterns, then the artificial structure will "drive" the factor

analysis and create very stable factors which have little to do with subject responses." (pp. 4-5).

Many of the past MCMI studies have disregarded this issue, even after noting the problem (e.g., Choca et al., 1986). This issue also applied to the the Minnesota Multiphasic Personality Inventory (MMPI) (Shure & Rogers, 1965) and it did not stop investigators from factor analyzing the older instrument. In the case of the MCMI, however, some investigators have tried to deal with the overlap problem by using correlations of shared and unshared scale items (Lunsden, 1986) or by performing a factor analysis on the matrix of the item-overlap coefficients (Gibertini & Retzlaff, 1987). Even if those may be good statistical strategies, they tend to complicate the handling of the data enough so as to obscure the clinical significance of the results.

The present investigation avoids the issue of scale overlap by working with the patients' answers to the individual items of the inventory rather than the overlapping scales. To the authors' knowledge, this type of work has never been done before with the MCMI. A factor analysis of the items also provides a way to test Millon's scales since, if the theoretical assumptions that led to the construction of the scales are correct, the items of the different scales should tend to cluster together.

METHOD

SUBJECTS. The authors collected 2,129 MCMI's from hospitalized male psychiatric patients at two different Veterans Administration medical centers during a period of several years. The psychiatric units were designed for acute care and had a fairly heterogeneous population as far as the diagnosis is concerned. Excluded from the present study were female patients (due to the small number), patients who were on repeat admissions, patients who were unable or unwilling to complete the inventory, and patients who gave invalid protocols (endorsement of one or more patently absurd items).

PROCEDURE. All subjects were administered the MCMI in the standard form. The subjects' item responses were then subjected to a principle factors and principle components analysis. In order to extract the proper number of factors three criteria were considered: the number of factors in Millon's hypothesized model (20), a scree test (Cattell, 1966), and the interpretability of the resulting factor structures (Gorsuch, 1983; Tabachnik & Fidell, 1983). Kaiser's criterion, promoting the retention of all factors with unrotated eigenvalues greater than one (Kaiser, 1961), was not followed because the mean final communality estimate after iteration was substantially less than one; Kaiser's criterion overestimates the number of factors when the final communality estimates are substantially less than one (Gorsuch, 1983). Also, the scree test (Cattell, 1966) has been shown to be the equivalent of Bartlett's significance test (Horn & Engstrom, 1979), which is less sensitive to differences in communality estimates than the roots greater than one criterion (Gorsuch, 1983). After determining

the number of factors the resulting factor structure matrix was subjected to a varimax rotation.

RESULTS

Plotting the eigenvalues from both the initial and the final communality estimates showed a break between the seventeenth and twenty-first factors. A solution with twenty-one factors was examined to determine how many "non-trivial" factors could be obtained (Gorsuch, 1983; Howard & Gordon, 1963). This is consistent with the strategy that it is better to over-factor than under-factor a model (Gorsuch, 1983). Trivial factors are those factors without uniquely defining variables. Seventeen interpretable factors emerged from this analysis accounting for 41% of the total variance.

DISCUSSION

The present study embodies, to our knowledge, the first attempt to factor analyze the MCMI on the basis of its 175 items, rather than on the basis of its 20 scales. This item-based factor analysis enables a greater number of factors to emerge, and as expected, our analysis yielded more factors than scale-based factor analyses. Eighteen interpretable factors emerged; thirteen of these factors contained items resembling scales from the MCMI.

Thus, support for six of Millon's Basic Personality Patterns scales, one of his Pathological Personality Disorders scales, and five of his Clinical Symptom Syndrome scales was obtained. Five scales less directly related to Millon's theoretical model also emerged, leaving eight of his theoretical scales unaccounted for.

The basic personality scales that emerged included Dependent, Narcissistic, Passive-Aggressive, Compulsive, Histrionic, and Schizoid. The pathological scale that emerged was Paranoid, and the clinical symptom scales that emerged included Dysthymic, Somatoform, Hypomanic, Drug Abuse, and Alcohol Abuse. The other five factors that emerged included suicidality, weepiness, lassitude, lability, and a validity scale. These last five factors may tap constructs related to the three Psychotic scales which were not represented in the other emergent factors.

The MCMI scales most poorly represented in the factor structure were those assessing psychoticism and severely maladaptive personality styles, a surprising finding in a sample of psychiatric inpatients. Also, in contrast to scale-based factor analyses, no general maladjustment factor emerged.

Although theoretical implications from this study must be proposed cautiously because the MCMI is a decidedly non-factorially based test, the present study does suggest redundancy among the MCMI scales. Yet, the redundancy found in this item-based factor analysis is not as severe as suggested in prior studies. The present findings might serve as the basis for developing non-redundant scales that capture Millon's personality theory.

Other rotations of the factors (e.g. oblique) or hierarchical methods might also offer results more consistent with Millon's theory. The authors are also aware that there is a revision of the MCMI (MCMI-II, Millon, 1987) which replaced 45 of the original 175 items and which may give a slightly different factorial structure as a result of those replacements. Finally, investigators should remember that this study used primarily male, veteran,

inpatients, and that other populations might yield different factor structures.

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Table 1. Summary of the available factor analyses of the MCMI.

FIRST AUTHOR	YEAR	SUBJECTS USED	# OF FACTORS	NAMES GIVEN TO FACTORS
Choca	1986	Psychiatric	3	Maladjustment Labile Acting-out Psychoticism
Flynn	1984	Drug Abusers	4	Negativism Detachment Passive-Submissiveness Paranoid
Gibertini	1987	Air Force Trainees	4	Distress Social Acting-Out Suspiciousness Submissive-Aggressiveness
Gibertini	1987	Alcohol Abusers	4	Distress Social Acting-Out Suspiciousness Submissive-Aggressiveness
Greenblatt	1986	Psychiatric	3*	Detachment Impulsiveness Psychoticism
McMahon	1988	Alcohol Abusers (2 samples)	4	Schizoid-Avoidant Anxious-Depressed Lability of Mood Paranoid-Delusional
Millon	1977	Psychiatric	4	Lability Paranoia Schizoid Social Restraint
Millon	1977	Substance Abusers	4	Lability Paranoia General Pathology Lability-Schizoid
Piersma	1986	Psychiatric	5	Interpersonal withdrawal Emotional Distress Impulsivity-Negativism Paranoid Distrust Dependency-Submission

* Using non-metric Multidimensional Scaling